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SUMMARY

EVALUATION OF THE WYOMING WATER SUPPLY PROGRAM

ENVIRONMENTAL PROTECTION AGENCY

DECEMBER 1972

PB 255 126

SUMMARY

EVALUATION OF THE WYOMING WATER SUPPLY PROGRAM

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SUMMARY

EVALUATION
OF THE
WYOMING WATER SUPPLY PROGRAM

WATER SUPPLY BRANCH
AIR AND WATER PROGRAMS DIVISION
ENVIRONMENTAL PROTECTION AGENCY
REGION VIII

DECEMBER, 1972

PREFACE

This SUMMARY is condensed from the report, EVALUATION OF THE WYOMING WATER SUPPLY PROGRAM. It presents the significant study findings and major recommendations needed to give Wyoming an effective Water Supply Program. More detailed information concerning the quality and protection of drinking water in Wyoming is included in the complete report, available from the Wyoming Department of Health and Social Services as well as from the Environmental Protection Agency.

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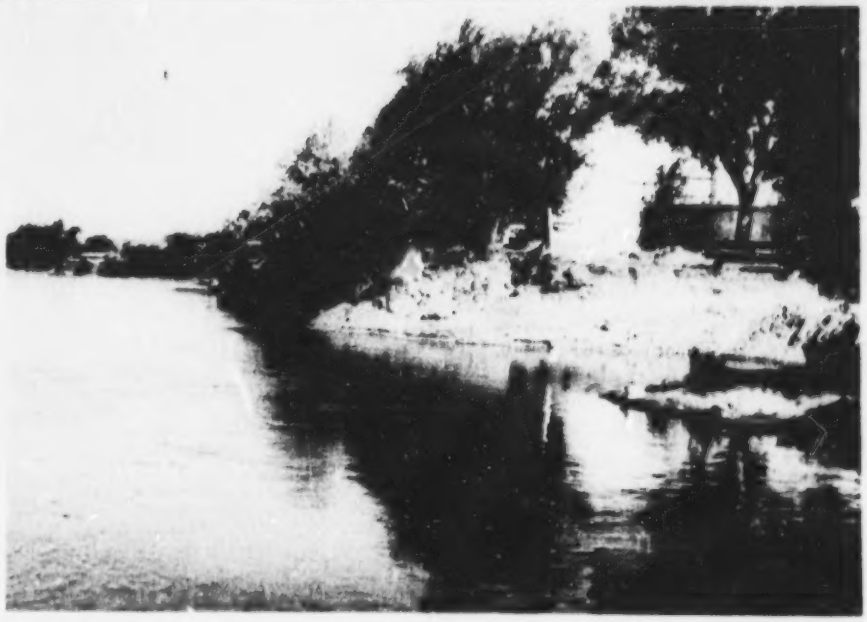


INTRODUCTION

EVALUATION
OF THE
WYOMING WATER SUPPLY PROGRAM

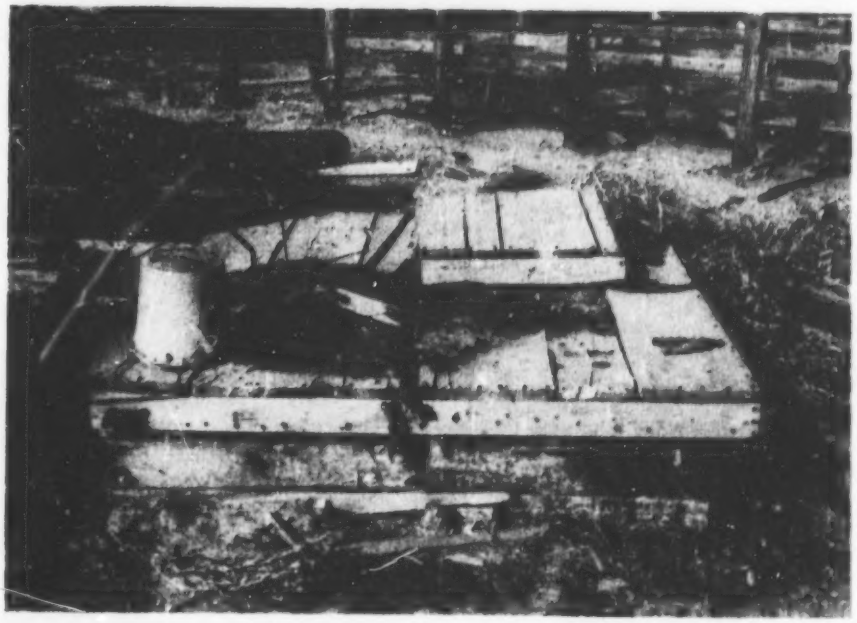
INTRODUCTION

Americans are served the finest and safest drinking water in the world. Since water was first implicated in the transmission of infectious diseases, more than 100 years ago, water treatment methods and technology have improved steadily. The dreaded water-borne epidemics, which one scourged vast areas, are no longer a concern in the United States, testifying to the efficiency of modern water treatment. As a result, a certain complacency has developed among our citizens concerning drinking water. The Community Water Supply Study[1] indicated that this complacency also has spread to the water utilities and regulatory agencies. The states are much less active in the regulation and surveillance of public water supplies. Public and legislative emphasis is being placed now on water and air pollution. In order to meet the outcry and spate of new pollution controls and implementation plans, the states have had to commit more and more of their resources to these new environmental concerns. Therefore, less time and money is being devoted to the drinking water programs. Contrary to popular belief, extensive water pollution control programs do not assure the public will receive safe and reliable drinking water. Such assurance can be gained only from a renewed awareness of the public health importance of drinking water and the establishment of active water supply programs at the State level.

Recognizing these considerations, Mr. Arthur E. Williamson, P. E., Director of Sanitary Engineering Services for the Wyoming Department of Health and Social Services, requested the Water Supply Branch of the Environmental Protection Agency to evaluate the Wyoming Water Supply Program.

The purpose of the evaluation was to determine the effectiveness of the Wyoming Water Supply Program as well as to recommend any improvements that may be needed to assure the Wyoming residents safe and wholesome drinking water.

PLAN OF STUDY



PLAN OF STUDY

Water Supplies in Wyoming

Wyoming is rich in history, scenery, and wide open spaces. The population of 332,416 is spread over 97,914 square miles. About 74% of these people are served by the 107 public water supplies listed by the State. There are an unknown number of small public supplies, which presently are not listed or under surveillance by the State. Over 70% serve less than 1,000 people, which is significant since it is these small systems which have the most difficulty providing safe drinking water consistently to their consumers. There are an estimated 31,000 private (individual) and 600 semi-public water supplies serving 26% of the total population. The bacterial and chemical quality of these supplies is, for the most part, unknown. The semi-public supplies are of particular concern since they include trailer parks, campgrounds, restaurants, and similar establishments which serve the more than six million tourists who visit Wyoming each year.

Purpose of Evaluation

1. To determine the general condition of Wyoming's public, private, and semi-public water supplies by on-site evaluation, bacteriological and chemical analyses and examination of existing records.

2. To evaluate the adequacy of the Water Supply Program based on existing legislation, regulations, manpower, budget, policies, surveillance, laboratory resources, operator training, and the condition of the water supplies.

3. To make any necessary recommendations needed for Wyoming to have and maintain an effective Water Supply Program in order to assure the State's citizens and visitors safe drinking water.

Water Supplies Studied

After discussions with Mr. Arthur E. Williamson, P. E., Director of Sanitary Engineering Services, three of Wyoming's twenty-three counties were selected for in-depth studies of the public, private, and semi-public water supplies. The three counties - Campbell, Lincoln, and Natrona - were selected to reflect differences in type of water supply and surveillance being used. Figure 1 shows the location of water supplies studied.

Twenty-three public supplies were surveyed in the three counties. These systems serve about 57,000 people, representing 20 percent of the State's population using public water supplies. Twelve of the supplies (the pipeline companies in Lincoln County) were not listed as public water supplies by the State and had not received any surveillance before the study. However, they are public water supplies as defined in the Wyoming Public Health Laws, and therefore were included in the study.

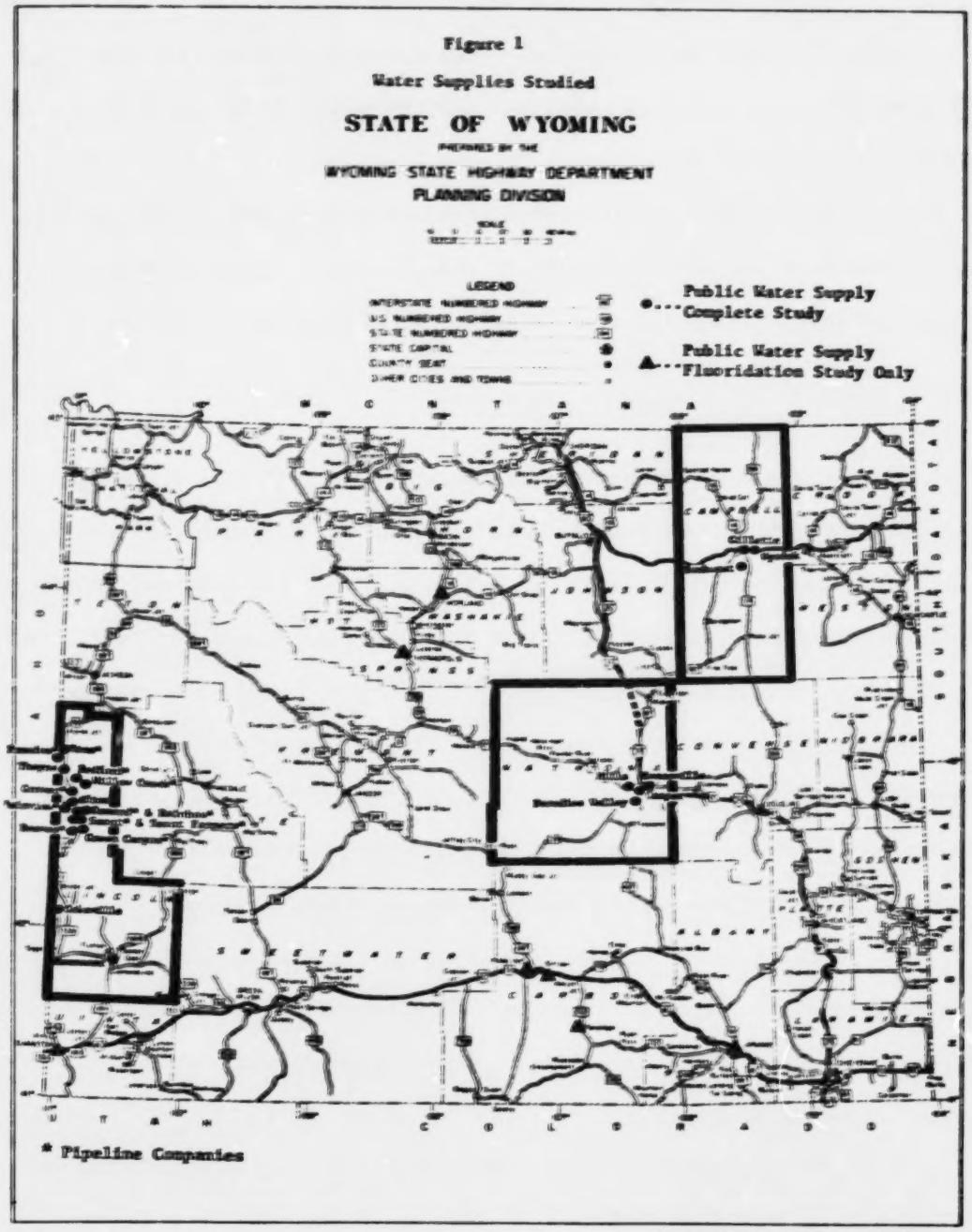
In addition, the communities of Laramie, Saratoga, Sinclair, Rawlins, Thermopolis, and Worland, which add fluoride to their water supplies were surveyed to determine the adequacy of the fluoridation program.

Thirteen semi-public supplies, serving over 18,000 people annually, were surveyed. These supplies represent two percent of the estimated 600 semi-public systems in Wyoming.

A total of 127 individual or private water supplies were evaluated in the three counties. These systems serve 820 people, or about one

Figure 1

Water Supplies Studied



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percent of those served by private supplies in Wyoming.

Overall, it was felt that these were a representative cross-section of Wyoming's water supplies and would provide a good indication of the effectiveness of the Water Supply Program.

The chemical and bacteriological quality of each supply was judged on the basis of the 1962 U. S. Public Health Service Drinking Water Standards (hereinafter referred to as the Drinking Water Standards).

Program Evaluation

The Water Supply Program was evaluated on each of the following:

1. Surveillance of Public Water Supplies - The adequacy of the State's routine bacteriological, chemical, and facilities-surveillance activities was evaluated on the basis of available records and the field surveys.

2. Surveillance of semi-public and private water supplies - This evaluation was based primarily on the conditions encountered during the field surveys. The adequacy and responsiveness of the Program to the problems found was the major area of consideration.

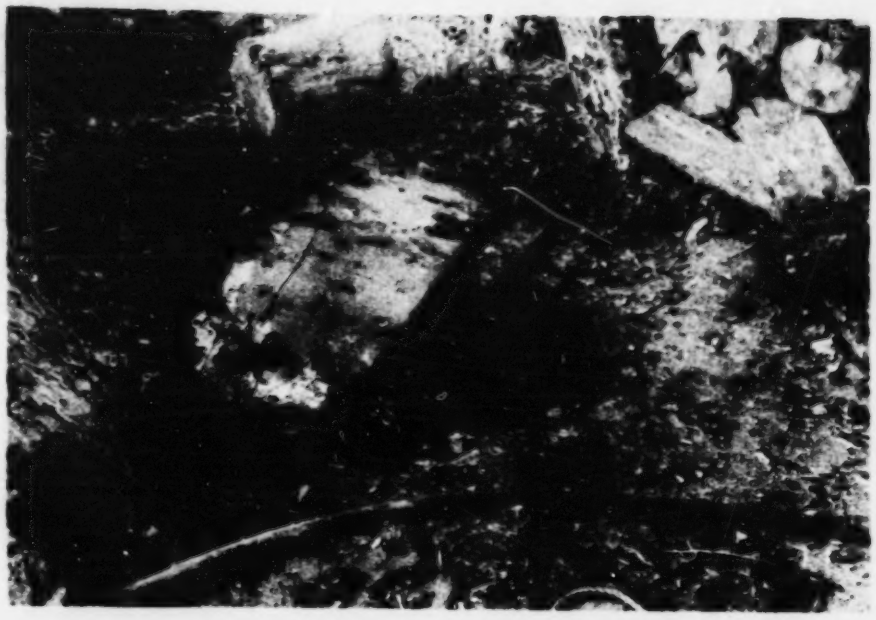
3. Legislative authority - The existing legislative authority of the Program was reviewed to determine if it has sufficient policy and regulation-setting power in order to conduct properly its activities and protect the public health.

4. Regulations and policy - The Program's existing regulations and policy were reviewed to determine if they were adequate and reflected current water supply practices.

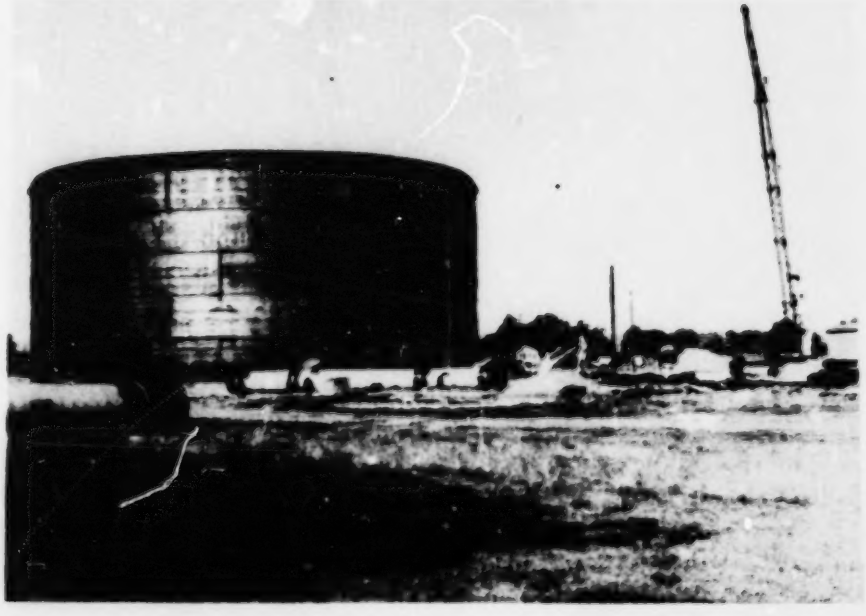
5. Laboratory support - A survey of the bacteriological and chemical laboratories was conducted to determine the capability of each laboratory to provide adequate support to the Program.

6. Budget and staffing - Based on the findings in the above categories, budget and manpower requirements were calculated and compared with those of the current program.

7. Other factors such as the level and adequacy of operator training and certification, amount of emphasis being placed on fluoridation and cross-connection control programs, coordination with and technical assistance given to other agencies concerned with water supply, and the status of water supplies on the national parks were evaluated during the study.



SUMMARY



SUMMARY

Evaluation of Water Supplies

Bacteriological Water Quality

Bacteriological testing is essential to determine if drinking water is safe. Since the isolation of pathogenic (disease-producing) organisms is complex and time-consuming, coliform bacteria are used as indicators of the sanitary quality of water. These bacteria are normal inhabitants of the intestines in warm-blooded animals; therefore are present in their fecal discharges. The Drinking Water Standards recognizes the coliform group as a reliable indicator of the bacteriological quality of drinking water. The presence of coliform organisms in drinking water suggests either inadequate treatment or access of contaminants to the water after treatment. Failure to meet the bacteriological quality standards indicates that drinking water is a potential carrier of infectious disease. Such a situation is a serious potential health hazard and calls for immediate corrective action.

1. Thirty-three percent (33%) of the 107 public water supplies failed to meet bacteriological quality standards for one or more months during 1971. These systems serve approximately 32,500 people.
2. Thirty-one percent (31%) of the 13 semi-public supplies tested failed to meet bacteriological quality standards. These systems serve an estimated 1,900 people annually.

3. Twenty-eight percent (28%) of the 127 individual water supplies tested failed to meet bacteriological quality standards. These supplies serve about 240 people.

Chemical Water Quality

Drinking water should not contain substances which are toxic or cause adverse health effects in man. Many harmful elements do occur naturally in the earth; therefore can be present in any water supply. The Drinking Water Standards has established mandatory chemical standards for such substances. If the mandatory limits are not met, the water supply should be rejected.

1. Nine percent (9%) of the 23 public water supplies studied failed to meet mandatory chemical drinking water limits. These systems serve about 3,230 people with water that could cause adverse health effects.
2. Seven percent (7%) of the 127 individual water supplies tested failed mandatory chemical drinking water standards. These supplies serve about 60 people.

Good quality drinking water should not contain substances which adversely affect its appearance, odor, or taste, and cause undue discomfort to man. The Drinking Water Standards has set recommended chemical limits to assure that drinking water contains no substance in concentrations which would render it undesirable. When the recommended standards are not met, consideration should be given to selecting a more suitable source of water supply.

1. Thirty-five percent (35%) of the 23 public water supplies tested failed to meet recommended chemical drinking water standards.

These systems serve approximately 52,540 people with aesthetically inferior water.

2. Forty-six percent (46%) of the 13 semi-public supplies tested failed to meet recommended chemical drinking water standards. These systems serve about 2,300 people annually.
3. Sixty-five percent (65%) of the 127 individual water supplies tested failed to meet recommended drinking water standards. These supplies serve 530 people.

Facilities

Water supplies include everything needed for the collection, treatment, storage, and distribution of drinking water from the source to the consumer's tap. Whether the facilities include an elaborate treatment plant or just a chlorinator, they must be able to produce consistently adequate quantities of safe drinking water and prevent contamination from entering the system at any point. Any condition, device, or practice in the water supply system and its operation, which allows water of questionable quality to be provided to the consumer, constitutes a health hazard.

1. Of the 23 public water supplies studied:
   a. Seventy percent (70%) needed additional treatment facilities and eighty-three percent (83%) needed improvement in the operation of present facilities in order to assure safe drinking water at all times.
   b. Ninety-six percent (96%) were not providing adequate disinfection (chlorination). Unsatisfactory disinfection removes the margin of safety against disease transmission by water.

c. Ninety-six percent (96%) had operators with little or no training in water treatment or systems, which accounts for the poor operation, maintenance and quality-control noted during the study.

2. Of the six public water supplies in Wyoming which fluoridate:
   a. Only two were maintaining a fluoride concentration within the range recommended by the State. The other four were all underfeeding, significantly reducing the benefits of fluoridation.
   b. Four had inadequate fluoride feed and control equipment.
3. Of the 13 semi-public water supplies studied:
   Eighty-five percent (85%), serving an estimated 14,300 people annually, were given an overall unsatisfactory rating due to deficiencies. None of the 13 systems disinfected their water supplies.
4. All of the 127 individual supplies studied had one or more facility deficiencies. Very few were constructed to prevent entrance of contamination.

Surveillance

The surveillance of water systems is one of the most important duties of state and local health officials. It demands constant vigilance over water quality, water system facilities and operational practices. The bacteriological and chemical quality of drinking water must be routinely monitored to detect possible contamination. To prevent serious health hazards from developing in a water supply, the physical facilities and operational procedures must be reviewed regularly by personnel trained in proper water supply practice.

1. Not all of the public water supplies are listed or under surveillance by the State. Twelve of these supplies were found during the study.
2. Of the 107 public water supplies listed by the State:
   a. Only nine percent (9%) had a formal inspection during 1971.
   b. Twenty-seven percent (27%) have not had an engineering evaluation since 1967.
   c. Thirty-five percent (35%) failed to submit the required number of bacteriological samples for two or more months during 1971.
   d. Fourteen percent (14%) have been rated unsafe by the State for at least three years.
   e. Ninety-six percent (96%) have never had a complete chemical analysis performed on their water. There is no routine chemical sampling program. This is a serious deficiency since certain chemical constituents can cause adverse public health effects.
3. Of the six water supplies which fluoridate:
   a. None submitted routine check samples to the State during 1971.
   b. Only two were inspected during 1971.
4. With the exception of Natrona County, there is no effective surveillance of the estimated 600 semi-public supplies. The actual number of supplies is unknown. Sanitary surveys of the water sources are not being conducted. Very few are submitting routine bacteriological samples and none are submitting samples for chemical analysis.

5. An effective level of surveillance of semi-public and individual supplies was being provided by the local health department (Casper-Natrona County Health Department) studied. Extensive bacteriological testing is being conducted, as well as sanitary surveys of water sources and septic tank installations. As a result, Natrona County had a much lower percentage of contaminated individual supplies than the other two counties surveyed.
6. There are only two local health departments in the State, which limits the overall surveillance and technical assistance programs.

Water Supply Program Evaluation

Several Wyoming statutes place legal responsibility concerning public and semi-public water supplies in the Department of Health and Social Services. Presently, the Water Supply Program activities are conducted by Sanitary Engineering Services (public water supplies) and Environmental Surveillance and Control Services (semi-public and individual supplies). However, these agencies have many other program responsibilities, including water pollution control, solid wastes, food service establishments, hospitals, nursing homes and schools. The result has been a steady de-emphasis on water supply activities. The funds and man-years available for drinking water protection in Wyoming are inadequate to support an effective program. A total of only about $44,000 was spent on drinking water activities during fiscal year 1971. As a comparison, almost twice that amount was expended for water pollution control. The percentage of Sanitary Engineering Services' budget alloted to public water supplies actually decreased from 23% in fiscal year 1971 to 19% in fiscal year 1972.

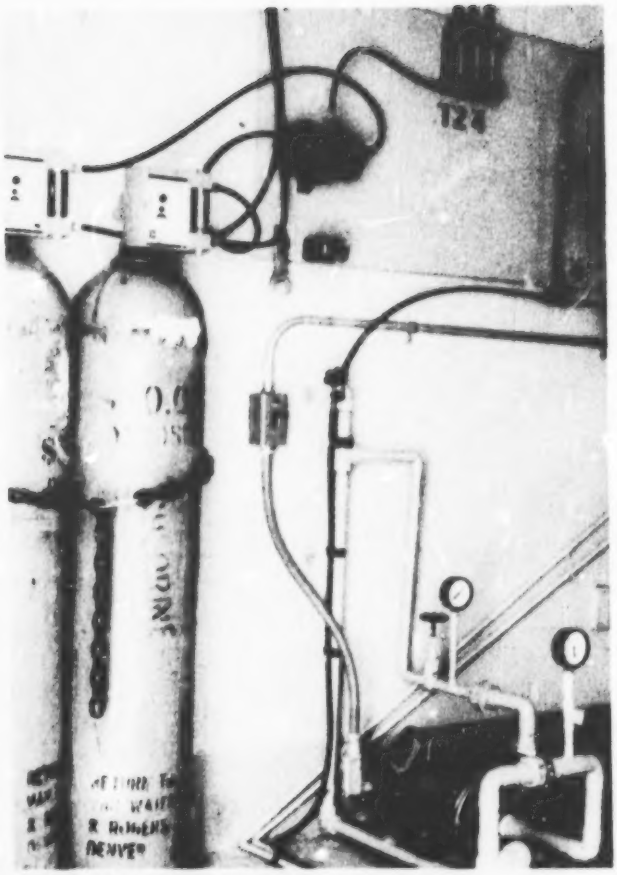
Staff limitations have prevented the Water Supply Program from fulfilling its responsibilities. Only 1.7 professional man-years are available, which represents a 50% decrease in staff during the last ten years. However, the number of water supplies and responsibilities has continued to increase. As a result, important water supply activities are not being performed, or they are being performed only in a cursory manner seriously reducing the Program's effectiveness.

Stronger State action is needed to correct water supply system deficiencies, especially when systems are rated unsafe year after year. The penalties for violating public health regulations are ill-defined and insufficient in regard to water supplies. The lack of legislation enabling the Department of Health and Social Services to adopt drinking water standards and a plumbing code also hampers surveillance activities.

Wyoming has very few regulations concerning development, construction, acceptable treatment, and operation of water supplies. There are no chemical quality standards for raw or finished drinking water, nor definitions of minimum acceptable treatment for types of water sources. No provisions are made for the orderly development of new public water supplies, nor minimum design or construction requirements. There are construction standards for water wells, issued by the State Engineer's Office, but they are not being enforced. Water well contractors are not required to be licensed. The lack of well-defined regulations and policies has caused problems for Water Supply Program staff as well as water works officials.

Operator training and certification activities have just started, therefore; most operators have little or no training, resulting in many of the operational difficulties noted during the study.

A false sense of security exists concerning the safety of water supplies in Wyoming. The Wyoming Water Supply Program is not meeting its responsibility of protecting the quality of water served to the State's residents and visitors. This situation has resulted from the steady decline in resources allocated to water supply activities. The time has come to reverse this trend. Waterborne disease outbreaks have occurred in Wyoming, and essentially in all the cases, it was shown that deficiencies existed in the water supply systems during the time when disease was transmitted. Furthermore, these deficiencies either were unrecognized because of inadequate surveillance for public health hazards, or were recognized but not remedied due to ineffective persuasion or enforcement by health officials. Deficiencies similar to those responsible for the outbreaks are present in the water supplies of Wyoming and were found during this study. The requisites for repetition of the tragic waterborne outbreaks of the past, namely inadequate surveillance of water supplies serving the public, and the presence of diseased individuals, definitely exist in Wyoming. An increase in the occurrence of waterborne disease obviously would cause needless human suffering and might result in a sharp reduction in the $150 million which tourism brings into Wyoming each year. In other words, Wyoming no longer can afford to overlook the importance of the Water Supply Program and shirk its responsibilities to protect the public health of its citizens. The recommendations of this report need to be implemented if Wyoming is to assure each resident and visitor an adequate and safe supply of drinking water.



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RECOMMENDATIONS

RECOMMENDATIONS

A primary purpose of the evaluation was to propose recommendations needed for Wyoming to have an effective and responsive Water Supply Program. These recommendations are listed below:

1. A Water Supply Branch be formed within Sanitary Engineering Services to be responsible for all public, semi-public and individual water supply activities. The Branch should have a minimum annual budget as follows:
   a. Water supply activities - $105,000
   b. Laboratory services - $ 45,000
   Total - $150,000
2. The Water Supply Branch be staffed initially with six professionals and three secretaries.
3. The water supply activities be decentralized by assigning one man-year each to district offices in Rock Springs, Worland, Gillette and Torrington.
4. Adequate space and equipment be provided for suitable bacteriological and chemical laboratory facilities in order to conduct routine drinking water analyses. An additional bacteriologist, two chemists, and a secretary should be hired specifically for this purpose.
5. Legislation be enacted concerning the following items:
   a. To change the definition of a public water supply to include all water supplies which serve the public.
   b. Delegating authority to the Department of Health and Social Services to adopt drinking water standards.

c. Delegating authority to the Department of Health and Social Services to specify required minimum forms of treatment for water sources.

d. Phasing the voluntary certification program into mandatory certification of waterworks and wastewater operators.

e. Mandatory fluoridation of community water supplies serving more than 500 people.

f. Adoption of a State Plumbing Code with specific provisions prohibiting cross-connections.

g. Mandatory certification of water well contractors.

h. Adoption of procedures for the orderly development of new public water supplies.

6. The Water Supply Regulations be revised and expanded to reflect current water supply practice. The following specific items should be included:

a. Adoption of the 1962 U. S. Public Health Service Drinking Water Standards or their latest revision.

b. Mandatory disinfection of all water systems serving the public.

c. The proper development and planning of new water supplies, including minimum design criteria.

d. Require that plans and specifications be prepared by a professional engineer registered in Wyoming.

e. Require all supplies which serve the public to submit routine samples for bacteriological and chemical analyses.

f. Require an engineering inspection in addition to bacteriological and chemical analyses before any system which will serve the public is allowed to go into service.

g. All communities which fluoridate be required to submit routine check samples for analysis.

h. Require that a legally constituted group be designated in charge of each public water supply.

i. Require each public water supply to submit operating reports on a periodic basis.

7. The Water Supply Program increase and improve its surveillance of public and semi-public water supplies to at least the minimum levels outlined in the Drinking Water Standards and the Manual for Evaluating Public Water Supplies. These activities should include but not necessarily be limited to:

   a. Thorough periodic sanitary surveys of each system, setting priorities and time schedules for those systems having deficiencies. Normally, all supplies should have a formal inspection, including a report, annually. Supplies which fluoridate should be surveyed at least twice a year.

   b. Bacteriological surveillance sufficient to meet the 1962 U. S. Public Health Service Drinking Water Standards.

   c. Routine complete chemical analyses of all supplies.

8. Cooperative compliance with the Regulations of the Water Supply Program continue to be emphasized. However, if cooperation and persuasion fail to achieve prompt compliance, strong enforcement measures should be taken to protect drinking water and public health.

9. The State actively promote and assist in the establishment of local health departments.

10. Provisions be made for close coordination between the Water Supply Program and other governmental functions which affect water supplies, including:

    a. State Engineer's office,

    b. Farmers Home Administration,

    c. Local health departments.

    Regulations of other state agencies should reflect that principal authority for regulation of water supplies rests with the Water Supply Program.

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Mr. Robert Coffman, Director, Environmental Surveillance and Control Services - Wyoming Department of Health and Social Services.

Mr. Nix Anderson, Director of Environmental Health - Casper-Natrona County Health Department.

Mr. Don Hansen, County Supervisor, Lincoln County - Farmers Home Administration.

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